

The invention in which an exclusive right is claimed is defined by the following:

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1. A flexible vehicular light source adapted to mount on and conform to a shape of an external surface of a vehicle and to emit light that provides illumination of a surface over which the vehicle is traveling, indicates an intention of a driver to turn or stop the vehicle, and/or provides an indication of a location of the vehicle, said flexible vehicular light source comprising:

(a) a flexible substrate having a rear surface and a front surface, and including a plurality of flexible conductive traces, said plurality of flexible conductive traces being adapted to connect to an electrical system of a vehicle to receive an electrical current therefrom;

(b) a plurality of solid-state light emitting devices mounted in a spaced-apart array on the flexible substrate, said plurality of solid-state light emitting devices being electrically connected to the plurality of flexible conductive traces and energized by the electrical current, emitting light; and

(c) a transparent flexible envelope that extends over the plurality of solid-state light emitting devices, providing protection against abrasion, the light emitted by the plurality of solid-state light emitting devices passing through the transparent flexible envelope, said rear surface of the flexible substrate being adapted to mount on an exterior surface of a vehicle and being able to conform to a non-planar curve of the exterior surface.

2. The flexible vehicular light source of Claim 1, further comprising a plurality of internally reflective surfaces, each disposed proximate a different one of the plurality of solid-state light emitting devices, said internally reflective surfaces focusing the light emitted by the plurality of solid-state light emitting devices in a desired direction, away from the front surface of the flexible substrate.

3. The flexible vehicular light source of Claim 1, further comprising an adhesive applied to the rear surface of the flexible substrate for use in adhesively attaching the flexible substrate to the exterior surface of the vehicle.

4. The flexible vehicular light source of Claim 1, wherein the plurality of solid-state light emitting devices are arrayed in a plurality of groups, the solid-state light emitting devices in each group emitting light having a different waveband than those in an adjacent group.

5. The flexible vehicular light source of Claim 4, wherein the solid-state light emitting devices in a first group emit white light, the solid-state light emitting devices in a second group emit red light, and the solid-state light emitting devices in a third group emit amber light, said vehicular light source being thereby adapted to mount on a rear portion of a vehicle.

6. The flexible vehicular light source of Claim 1, wherein at least a portion of the solid-state light emitting devices in a first group emit infrared light.

7. The flexible vehicular light source of Claim 1, wherein at least a portion of the solid-state light emitting devices in a first group emit yellow light.

8. The flexible vehicular light source of Claim 1, wherein said vehicular light source includes a plurality of different groups of the solid-state light emitting devices that are separately selectively energizable, and wherein the transparent flexible envelope overlying the different groups is divided into different areas that are colored to transmit light of differing colors when each group of solid-state light emitting devices is selectively energized.

9. The flexible vehicular light source of Claim 1, wherein the plurality of light sources emit white light and the flexible vehicular light source is adapted to be mounted on a front exterior surface of a vehicle, to illuminate a surface over which the vehicle may advance.

10. The flexible vehicular light source of Claim 1, further comprising a totally internally reflective (TIR) lens that covers at least a portion of the plurality of solid-state light emitting devices, said TIR lens focusing the light emitted thereby in a desired direction.

11. The flexible vehicular light source of Claim 1, further comprising a totally internally reflective (TIR) lens for each of the plurality of solid-state light emitting devices, said TIR lenses focusing the light emitted by the plurality of solid-state light emitting devices away from the front surface, in a desired direction.

12. The flexible vehicular light source of Claim 1, wherein the flexible substrate is adapted to mount within a recess formed in the exterior surface of the vehicle.

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22 / 13. A flexible light emitting panel for application to an exterior surface of a vehicle, comprising:

(a) a flexible substrate sized and shaped to cover a selected portion of an exterior surface of a vehicle, said flexible substrate including a positive flexible conductive trace and a negative flexible conductive trace, each flexible conductive trace being adapted to couple to an electrical system of a vehicle to receive an electrical current;

(b) a plurality of solid-state light emitting devices spaced apart over at least a defined portion of an outer surface of the flexible substrate and mounted thereto, an anode of each solid-state light emitting device being electrically connected to the positive flexible conductive trace and a cathode of each solid-state light emitting device being electrically connected to the negative flexible conductive trace so that an electrical current conveyed thereby is applied to energize each of the plurality of solid-state light emitting devices;

(c) a flexible protective, generally light transmitting cover overlying said plurality of solid-state light emitting devices, said flexible substrate on which the solid-state light emitting devices are mounted and said flexible protective cover comprising a flexible panel that is adapted to be affixed to and conform to the exterior surface of a vehicle, even though the exterior surface is non-planar, producing light when the solid-state light emitting devices are energized by the electrical current.

14. The flexible light emitting panel of Claim 13, wherein the plurality of solid-state light emitting devices are grouped in regard to a color of light emitted thereby, said plurality of solid-state light emitting devices comprising a plurality of groups, each group emitting light of a different color.

15. The flexible light emitting panel of Claim 14, wherein the flexible panel includes a first group of solid-state light emitting devices that emit white light, a second group of solid-state light emitting devices that emit red light, and a third group of solid-state light emitting devices that emit amber light, said flexible panel comprising a tail light assembly for a vehicle.

16. The flexible light emitting panel of Claim 13, wherein the flexible panel is elongate and is adapted to be mounted on a front surface of a vehicle.

17. The flexible light emitting panel of Claim 13, further comprising a plurality of lenses, each lens focusing the light emitted by a different one of the plurality of solid-state light emitting devices in a predefined direction that is generally oriented away from the flexible substrate.

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18. The flexible light emitting panel of Claim 13, further comprising a plurality of totally internally reflective (TIR) lenses, each TIR lens reflecting the light emitted by a different one of the plurality of solid-state light emitting devices in a predefined direction that is generally oriented away from the flexible substrate.

19. The flexible light emitting panel of Claim 13, wherein the plurality of solid-state light emitting devices are electrically coupled to each flexible conductive trace with one of a solder and a conductive adhesive.

20. The flexible light emitting panel of Claim 13, wherein at least one of the anode and the cathode of each of the plurality of solid-state light emitting devices is connected to a corresponding one of the positive and negative flexible conductive traces using a flexible lead.

21. The flexible light emitting panel of Claim 13, further comprising a totally internally reflective (TIR) lens that covers at least a portion of the plurality of solid-state light emitting devices, said TIR lens focusing the light emitted thereby in a desired direction.

22. The flexible light emitting panel of Claim 13, wherein the flexible substrate is adapted to mount within a recess formed in the exterior surface of the vehicle.

23. A method for providing external lighting for a vehicle, comprising the steps of:

- (a) providing a flexible substrate having an electrical conductor adapted to couple to a source of electrical power on a vehicle;
- (b) mounting a plurality of solid-state light emitting devices in a spaced-apart array on a surface of the flexible substrate, so that the plurality of solid-state light emitting devices are coupled to the electrical conductor;
- (c) protecting the plurality of solid-state light emitting devices with a flexible, generally light transmissive cover that overlies the array of solid-state light emitting devices and also conforms to the exterior; and
- (d) attaching the flexible substrate to an external surface of the vehicle, so that the flexible substrate and the flexible generally light transmissive cover conform to even a non-planar shape of the external surface.

24. The method of Claim 23, further comprising the step of providing mounting means for affixing the flexible substrate to an exterior surface of a vehicle.